



TURTLE RIVER



TIMES

The newsletter of the A.R.M. Loxahatchee National Wildlife Refuge

Vol. 1 Issue 1
May - August 2002

From the Manager's Desk

by Mark J. Musaus

Welcome! We are excited to give you the *Turtle River Times*, a new publication of the A.R.M. Loxahatchee National Wildlife Refuge. Since "Loxahatchee" means "Turtle River," we thought it would be a fitting title for a publication that combines our calendar of events with a newsletter format to help keep you current on refuge management, refuge staff, volunteers, and some of the "critters" that are found in this special place we call the Everglades. We hope to produce three editions each year so you can be aware of and participate in some of the inspiring ways to learn more about the

You will be able to learn more about those brightly colored grasshoppers that seem to be crawling all around the refuge and what that tree growing in the water along the boardwalk is that often produces fruit that looks like "Granny Smith" apples. There is also a great article on what is happening in the refuge impoundments. Last but not least, there are four months worth of events listed. Wow! This is supposed to be our slow season!!

Up front, we would like to acknowledge and thank our Friends group, the Loxahatchee Natural History Association. This newsletter wouldn't be possible without their support and financing.



refuge, such as guided butterfly walks or special programs at the Visitor Center.

In this first edition, you will get a chance to meet some of our biological staff and their areas of responsibility.

Let me close by rephrasing a commercial made famous by Kelloggs Corn Flakes a couple years ago... I hope you will read this again for the first time. Our goal is that you will become a regular reader of this newsletter as well as a visitor to the refuge. But don't stop there. Consider signing up to become both a volunteer and a Friend of the refuge.

In this issue

| | |
|-------------------------------|-------|
| Welcome..... | 1 |
| Bio-update..... | 2 |
| Volunteer Awards..... | 3 |
| Photo Contest..... | 3 |
| Lubber Grasshoppers..... | 4 |
| Butterflies and Dragonflies.. | 5 |
| Calendar of Events..... | 6-7 |
| LNHA Update..... | 8 |
| Pond Apples..... | 9 |
| Impoundment Update..... | 10-11 |

What's Up With Biology?

By Laura Brandt, Sr. Wildlife Biologist

OK, Quiz Time! How many biologists work at the refuge and what do they do? Take your time, think about it. What do you think? One? Two? Three?

Well, let's do a count. There's me (**Dr. Laura Brandt**), the Sr. Wildlife Biologist. I oversee the bio program at the refuge, am heavily involved with Everglades restoration issues, and am a Tri-chair of the Adaptive Assessment Team. **Marian Bailey** is our Refuge Biologist. She handles the on-the-ground wildlife issues, including, as many of you may know, the impoundment management. **Bill Thomas** is our Exotic and Fire Program lead. He deals with all the issues relating to the control of exotics on the refuge, conducts wildlife surveys (when he has time!), and makes sure that the fire program is integrated with

University. Her study is part of a larger study looking at the ecological role of tree islands at the refuge. She is studying ant richness and diversity on tree islands with different levels of infestation from Old World Climbing Fern and Melaleuca. **Cindy Brashear** is a Fish and Wildlife Biologist hired out of the FWS Vero Beach, Ecological Services Office. Her office is on the refuge and we like to claim her as ours! She spends most of her time in meetings helping to make sure the refuge and FWS issues are considered in the planning for Comprehensive Everglades Restoration Plan projects.

We also are fortunate to have three Senior Scientists, **Dr. Nick Aumen** (Aquatic Ecologist), **Dr. Mike Waldon** (Hydrologist), and **Dr. Paul McCormick** (Aquatic Ecologist) who are part of the Everglades Program Team. The Everglades Program Team is a joint effort between the National Park Service (Everglades National Park) and the Fish and Wildlife Service (Loxahatchee NWR) and was set up to address water quality issues that affect the refuge and the park.

In addition, there are numerous other biologists from Universities (**University of Florida, Florida Atlantic University, and University of West Florida**, for example), other agencies (e.g. **South Florida Water Management District (SFWMD), United States Geological Survey (USGS), and Florida Fish and Wildlife Conservation Commission (FWC)**) and ecological consulting firms (e.g. **Foster Wheeler Environmental**

Corporation), all doing research and monitoring on the refuge. All of these folks provide valuable information for refuge management. In future issues of this newsletter, we will highlight the work of one or more of these people so that you have a better understanding of the extent of the biological activities going on at Loxahatchee. If you have additional questions about the biology program, please don't hesitate to contact one of us.



Loxahatchee biologists pictured left to right: Dawn Greenlee, Laura Brandt, Bill Thomas, Marian Bailey, Camille Darby, and Gayle Martin

exotic control and other biological programs. **Bruce Arrington** focuses on field sampling for addressing water quality and contaminant issues in the impoundments, the interior, Cypress Swamp, and Strazzulla Marsh. **Dawn Greenlee** is our Prescribe Fire Specialist. She is jump-starting our fire program so that we can use fire as a tool to improve habitats both at Loxahatchee and Hobe Sound NWR. **Gayle Martin** is our Biological Technician who does everything! She assists all of us with projects as well as being responsible for monitoring the water levels within the interior and Cypress Swamp. She also assists other researchers by providing airboat transportation to their research sites. **Camille Darby** is an Intern working on a Masters Degree at Florida Atlantic

Volunteer Awards Ceremony

On March 22, the refuge celebrated the efforts of its volunteers by having an awards ceremony and get-together. Refuge staff and guests gathered under the Chickee at the Marsh Trail to recognize and honor volunteers for hours worked, as well as for their special contributions to the refuge.

Refuge Manager Mark Musaus welcomed the group, thanking them for their donated time working in the widely varied areas of volunteerism on the refuge. He noted volunteer contributions on refuges across the country and the significance of volunteers as we prepare to celebrate the refuge system's 100th birthday in 2003.

Various staff members presented awards for individual hours of service, starting with 150 hours and ending with over 6,000 hours of service donated by **Hal Wiedemann**. Friend of the Service awards were given to **Hal Albertson**, **Harvey Eisen**, and **John Marshall** for 2,000 volunteer hours of service. Special recognitions for various volunteers were also presented.

The Loxahatchee Natural History Association provided refreshments and drinks.

In 1981, the volunteer program began with a handful of enthusiastic people donating 173 hours of service. Twenty years later in 2001, some 628 volunteers contributed 16,516 hours of service to the refuge.

Ode To a Cattail - Pulling Morning

Eight students and two teachers from the Arthur Morgan School in North Carolina spent a morning pulling cattail from around cypress seedlings that had been planted last year in Compartment B. The small but hardy group had a great time and even wrote a song entitled, "Ode to a Cattail-Pulling Morning." sung to the tune of "Take Me Out to the Ballgame."

Take me out to the Everglades
Take me out to the Swamp
Give me a pin and a blue goose pen
I'll spend my days wading out in the sun
For its root, root, root, out the cattails
If they don't come out it's a shame
For it's one!, two!, three pulls
you're down in the mud again!

19th Annual Photo Contest

by Ruth Levow

On Sunday, April 7, LNHA awarded 29 prizes to the winning photographers in the 19th annual Photo Contest. The contest was open to all amateur photographers who were permitted to use either print or slide media. There were many entries and most were of such high quality that the judges had to really work to choose the very best. All photographs had to be taken on the Refuge.

Phil McCullem, LNHA President, presented checks to the following winners: in the Slide Division, First Place in Wildlife went to **Arlene Spagna**; **Lisa Keeney** received Second Place in that category and **John Everett** was the Third Place winner. In the Flora Category, **Cindy Bartosek** was awarded First Place, with **Rosalie Frost** getting Second Place and **Paul Bumpus** in Third Place. **Cindy Bartosek** was the First Place winner in the Spirit of a Florida Wetland Category, with **Leonard Nadel** receiving Second Place. Third Place went to **William Haydu** in that category. **Jim Wiggins** received First Place in the Recreational Use on the Refuge category, with **Jen Maroe** getting the Second Place award. The last category, Patterns in Nature, found **Jerry Judge** with First Place and **Cindy Bartosek** taking Second Place. **Hedda Pessin** was the Third Place winner.

Mr. McCullem also presented checks to winners in the Print Division. **Saul Meyers** was the First Place winner in the Wildlife category. **Leonard Friedman** took Second Place and **Lorne Groves** won Third Place. **Seah Sheehan** received First Place for Flora and **Larry Greenberg** was the Second Place winner, with **James Knill** receiving Third Place. The Spirit of a Florida Wetland category had **Leonard Hellerman** as the First Place winner and **Ron Garofolo** with Second Place. **Julie Richman** was the Honorable Mention winner. **Ron Garofolo** received First Place for Recreational Use category and **Julie Tracy** took Second Place in that category. In Patterns in Nature, the First Place winner was **Vernon Johnston**, with **Leonard Hellerman** receiving Second Place for his print and **Sherry Scott** receiving Third Place.

LNHA was very pleased with the number of entries and the wonderful photographs representing various aspects of the Refuge. The reception drew a good crowd; it was interesting to see many photographers after the reception out on the refuge with their cameras, starting out to look towards the next contest.

Lubber Grasshoppers

Berni Reeves

The large orange insects that are frequently seen on the Marsh Trail throughout the summer are



**Adult
Lubber**

Southeastern Lubber Grasshoppers (*Romalea microptera*). This species is found throughout the South Eastern USA, ranging from North Carolina and Tennessee, west to Louisiana, and throughout the state of Florida. Their prime habitat is grassland, where they feed upon a wide variety of vegetation.

Reaching lengths of $2\frac{3}{4}$ inches, the Lubber Grasshopper is one of the largest grasshoppers in North America. It is their large size, together with their bright coloration, which makes the adult insects highly conspicuous. Lubber Grasshoppers are unable to fly, and their movement, either by crawling or hopping, is rather cumbersome.

The female Lubber lays her eggs in soil, the eggs hatching from February onwards. The young Lubbers, which are known as nymphs, appear different from adults, as they are black in color, with distinctive red or yellow markings. As they get older, they will undergo several molts, each stage a little larger than the previous one, before finally molting to the adult stage, when they become orange, marked with black. The adults first begin to develop around June and are seen until November.

**Young
Lubber**



Although the nymph and adult stages of the Lubber Grasshopper are different colors, they both have distinctive markings that warn would-be predators to beware. When attacked by a predator or handled roughly, they will secrete a dark, evil-smelling fluid from pores on their body. These toxic secretions are a good form of protection for the flightless Lubber. Many insects are able to protect themselves in a similar manner and are known as aposematic insects. The toxins are either synthesized by the insects themselves, or, as in the case of the milkweed butterfly, are obtained by feeding on plants that contain toxic chemicals. As the Lubber Grasshopper feeds on a variety of vegetation, it is unknown whether a particular food source contains the toxin or whether it is self-synthesized.

Gator Bert Wants You !

The volunteer program offers a wide variety of jobs and projects. Opportunities include working in the refuge Visitor Center and book store, leading tours, assisting with environmental education programs, working with office staff, assisting biologists, presenting off-site programs to organizations, working with the maintenance volunteer crew, roving the trails as a nature interpreter, removing invasive exotics, and providing technology support.



Volunteer Coordinator Lois Chapman has a special need for a volunteer to work from two to four hours per week on the record keeping and clerical side of the volunteer program. She is seeking a person who is comfortable with a computer and has a willingness to learn Word Perfect and Word.

If you are interested in a volunteer position at the refuge, please call **Lois Cpahman** at **(561) 734-8303** or send an email to **lois_chapman@fws.gov**.

BUTTERFLIES AND DRAGONFLIES

Hal Wiedemann

Viewing and identifying butterflies, dragonflies, and damselflies is becoming a very popular activity. The Atala Chapter of the North American Butterfly Association (NABA) is located in Palm Beach County and has regular meetings and field trips. There is also the Dragonfly Society of the Americas (DSA) which is founded to promote the study of Odonata (dragonflies and damselflies). They have field meetings and publish a news journal and other literature.

To help educate the visitors at the refuge, a butterfly garden has been planted in the island in the center of the Visitor Center parking lot. It contains various host plants on which the female butterflies can lay eggs and young caterpillars can feed upon until the time to make the change into adults. There are also various flowers on which adult butterflies can feed before starting the life cycle over again. We also have a very large variety of wildflowers and plants which attract butterflies throughout the refuge. In the NABA annual Fourth of July Butterfly Count, 2023 butterflies were counted on the refuge.

Refuge butterfly walks are offered several times a year. The next walks are scheduled for June 22 and July 27. You can also tour the refuge yourself and look for butterflies. They are everywhere. Hot spots are along the north and east sides of the Marsh Trail, the south side of Impoundment C-5, the east side of C-8, and along the south side of Lee Road.

The more frequently seen butterflies are the Queen, White Peacock, Soldier, Gulf Fritillary, and the Zebra Heliconian. Beautiful names for beautiful butterflies.

For your help in identifying the butterflies, I suggest the book, "Butterflies through Binoculars: Florida," and the fold out guide, "Florida Butterflies and their Caterpillars." Both are sold at the refuge Visitor Center. I would also recommend the use of a binocular that has a close focus of under 6 feet for viewing the butterflies.

Dragonflies and damselflies almost demand the use of a close focusing binocular for viewing these small, beautiful insects. Unless you are somewhat of an

expert, you will have to wait until they have landed. They love mosquitoes and they can be found everywhere there are small insects for them to eat. Good spots to view them are along the north and west side of the Marsh Trail, the west side of the Visitor Center Parking Lot, along the sidewalk between the Visitor Center and the Bus Parking Lot, and north along the west side of the Cypress Swamp where the water control structure is located.

The more frequently seen dragonflies are the Eastern Pondhawk, Blue Dasher, Four-spotted Pennant, Halloween Pennant, and the Blue Corporal. Damselflies are seen very infrequently. I have seen 5 species on the refuge, including the Furtive Forktail and the Duckweed Firetail.

The best field guide on dragonflies is "Dragonflies of the Florida Peninsula, Bermuda and the Bahamas." For damselflies, the best guide is "Damselflies of Florida, Bermuda and the Bahamas." Both are authored by Sidney W. Dunkle. Unfortunately, both of these books are presently out of print. but may be available as used books. It is hoped that they will be revised in the near future. The recent book, "Dragonflies through Binoculars: North America" (Sidney W. Dunkle) is also recommended.

On my butterfly and wildflower walks at the refuge, I frequently identify the dragonflies seen. Come out to the refuge and view all these small and very interesting insects.



***Zebra
on
Beggars
Ticks***

2002 Summer Events Schedule

Saturday, May 11

INTERNATIONAL MIGRATORY BIRD DAY

EARLY BIRD WALK

7:00 AM Marsh Trail

This one-mile walk is for the birds and the early risers. Bring binocular, field guide, and insect repellent.

BIRD CALLS PROGRAM

7:30 AM Marsh Trail Chickee

"I can hear it, but I can't see it." Find out how to identify birds that are hard to see.

BIRD WATCHING FOR BEGINNERS

8:00 AM Marsh Trail Chickee

If you are interested in developing your birding skills, then this is the program for you.

BEAKS AND FEET

**8:30 AM Visitor Center
auditorium.**

Do you ever wonder why bird beaks and feet are different from one species to another? A naturalist will bring birds from the Palm Beach Zoo at Dreher Park to demonstrate how they find and catch their food.

LIVE BIRD OF PREY PRESENTATION

**9:30 AM Visitor Center
auditorium.**

Wildlife residents from the Treasure Coast Wildlife Hospital will visit the refuge as part of a program about birds of prey.

CHILDREN'S BIRD CRAFT ACTIVITY

11:00 AM Marsh Trail Chickee

Join a representative from the Palm Beach Zoo at Dreher Park for a special children's bird craft activity.

Saturday, June 1 - July 31

PHOTO EXHIBIT "SOUTH FLORIDA'S WILDLIFE"

Members of the Pines West Camera Club will have on display a photography exhibit of the wildlife of South Florida in the Visitor Center.

Saturday, June 1

EARLY BIRD SPECIAL

7:30 AM Marsh Trail

This one-mile walk is for the birds and the early risers. Bring binocular, field guide, and insect repellent.

Saturday, June 8

KIDS FISHING DAY

8:30 AM - 12:30 PM

Learn about fishing regulations and identification. See what bait you catch when you throw a cast net or use a dip net. Experience the thrill of catching a fish. All children must be accompanied by an adult.

**RESERVATION REQUIRED -
LIMITED TO 25 CHILDREN**

Sunday, June 9

REPTILE & AMPHIBIAN WALK

1:00 PM Marsh Trail

Is that gator eating a turtle? Just what is a siren? Get the answers to these questions and more when you join a naturalist in the search for the shy and elusive reptiles and amphibians.

Sunday, June 16

SWAMP STROLL

2:00 PM Visitor Center

Enjoy the beauty of a cypress swamp from a ½ mile-long boardwalk trail. Learn about "swamp tea," floating plants, and thigmotrophism as a naturalist reveals the swamp's secrets to visitors.

Saturday, June 22

BUTTERFLIES & WILDFLOWERS WALK

**9:00 AM - Visitor Center
Parking Lot**

Florida's native butterflies are more abundant during the summer months and a joy to watch. Also discover which wildflowers they prefer. Join a volunteer naturalist for a walk to view these small wonders of the refuge.

Sunday, June 23

SWAMP STROLL

2:00 PM Visitor Center

Enjoy the beauty of a cypress swamp from a ½ mile-long boardwalk trail. Learn about "swamp tea," floating plants, and thigmotrophism as a naturalist reveals the swamp's secrets to visitors.

Sunday, July 7

REPTILE & AMPHIBIAN WALK

1:00 PM Marsh Trail

Is that gator eating a turtle? Just what is a siren? Get the answers to these questions and more when you join a naturalist in the search for the shy and elusive reptiles and amphibians.

Sunday, July 14

SWAMP STROLL

2:00 PM Visitor Center

Enjoy the beauty of a cypress swamp from a ½ mile-long boardwalk trail. Learn about "swamp tea," floating plants, and thigmotrophism as a naturalist reveals the swamp's secrets to visitors.

Saturday, July 20

EARLY BIRD SPECIAL

7:30 AM Marsh Trail

This one-mile walk is for the birds and the early risers. Bring binocular, field guide, and insect repellent.

Please note those programs requiring reservations. For reservations and information, call (561) 734-8303.

2002 Summer Events Schedule

Sunday, July 21

SWAMP STROLL

2:00 PM Visitor Center

Enjoy the beauty of a cypress swamp from a ½ mile-long boardwalk trail. Learn about “swamp tea,” floating plants, and thigmotrophism as a naturalist reveals the swamp’s secrets to visitors.

Saturday, July 27

CANOEING THE EVERGLADES

7:30 AM Headquarters Boat Ramp

Take a journey through the Everglades with an interpreter on our canoe trail. Bring canoe, PFD, water, sun/rain protection, and insect repellent. Some canoeing experience is recommended. **RESERVATION REQUIRED**

Saturday, July 27

BUTTERFLIES & WILDFLOWERS WALK

9:00 AM Visitor Center Parking Lot

Florida’s native butterflies are more abundant during the summer months and a joy to behold. Also discover which wildflowers they prefer. Join a volunteer naturalist for a walk to view these small wonders of the refuge.

Sunday, August 4

REPTILE & AMPHIBIAN WALK

1:00 PM Marsh Trail

Is that gator eating a turtle? Just what is a siren? Get the answers to these questions and more when you join a naturalist in the search for the shy and elusive reptiles and amphibians.

Saturday, August 10

CANOEING THE EVERGLADES

7:30 AM Headquarters Boat Ramp

Take a journey through the Everglades with an interpreter on our canoe trail. Bring canoe, PFD, water, sun/rain protection, and insect repellent. Some canoeing experience is recommended. **RESERVATION REQUIRED**

Sunday, August 11

SWAMP STROLL

2:00 PM Visitor Center

Enjoy the beauty of a cypress swamp from a ½ mile-long boardwalk trail. Learn about “swamp tea,” floating plants, and thigmotrophism as a naturalist reveals the swamp’s secrets to visitors.

Saturday, August 17

BUTTERFLIES & WILDFLOWERS WALK

9:00 AM Visitor Center Parking Lot

Florida’s native butterflies are more abundant during the summer months and a joy to behold. Also discover which wildflowers they prefer. Join a volunteer naturalist for a walk to view these small wonders of the refuge.

Saturday, August 24

EARLY BIRD SPECIAL

7:30 AM Marsh Trail

This one-mile walk is for the birds and the early risers. Early migrants might be seen on this late August walk. Bring binocular, field guide, and insect repellent.

Refuge Hours & Fees

The refuge is open to the public from sunrise to sunset daily. Exact times are posted at each entrance and change with the hours of daylight. Currently the refuge opens at 6:00AM and closes 8:30PM.

Summer hours for the Visitor Center are Wednesday through Friday from 9:00AM to 4:00PM and on Saturday and Sunday from 9:00AM to 4:30PM. The Visitor Center is closed on Mondays and Tuesdays, but the rest of the refuge is open.

A fee of \$5.00 is charged to *private* vehicles entering the refuge. When the fee booth is unmanned, visitors are subject to the honor system and should pay at the fee shelter next to the fee booth.

Meet the Staff

Project Leader....Mark Musaus

Refuge Operation

Specialist....Mindy Gautreaux

Everglades Program

Team....Michael Waldon, April Thompson, Nick Aumen, Paul McCormick, Leslie MaxGregor, Matt Harwell

USFWS Ecological

Services....Cindy Brashear

Administration....Kim Arserio, Jean Ryan

Law Enforcement....William Calvert, Anita O’Conner

Wildlife and Habitat

Management....Laura Brandt, Marian Bailey, Bruce Arrington, Gayle Martin, William Thomas, Jr.; Dawn Greenlee

Maintenance OperationsSteve Matzkow, Manuel Garcia, Randy Grabo, Jerry Grist

Environment Education &

Interpretation....Lois Chapman, Serena Rinker, Todd Grabel

Fee Staff....Keith Boliek, Marie Pohl, Matt Rogers, Chris Wardlow

Please note those programs requiring reservations. For reservations and information, call (561) 734-8303.

The LNHA Needs You

The Loxahatchee Natural History Association is expanding on several fronts and is seeking active participants in several areas.

Store Manager

We are actively seeking to employ, on a part-time basis, a detail-oriented individual to manage our Book Store. This person will be responsible for all aspects of the Book Store operation. Duties will include inventory control, training of support staff, closing out the day's receipts, and any other responsibilities as deemed necessary by the Board of Directors. This will be a paid position with the possibility of going full-time. Hours are flexible. We are not looking for a minimum wage individual. We will pay based on abilities, willingness, and attitude. Experience with Quick Books would be a plus. Ruth Levow is heading the committee responsible for staffing and can be emailed at ruthl@lnha.net. More information regarding the LNHA can be found at www.lnha.net.

Board of Directors

We are looking to expand our Board. Interested persons must be environmentally conscious, ecologically concerned and willing to get involved with the many activities the LNHA deals with during the course of the year. You will be expected to serve on at least three committees. Please contact Jean Poleshuck at jeanp@lnha.net for more information.

First National Friends Conference

Ruth Levow

On February 22 through 25, 2002, the First National Refuge Friends Conference took place in Washington, DC at the Wyndham Hotel. I was privileged to attend as a delegate from LNHA. It was quite an eye-opener and a thrill to be present at the very beginning of what will become an annual event. It was such a success that we already have the dates for NEXT YEAR - Jan. 31 through Feb. 3, 2003 - also at the Wyndham in Washington, DC.

This conference brought together about 300 delegates from the entire Refuge System all over the US - including representatives of the Friends groups and some of the professional staff from refuges. Mark Musaus, Refuge Manager at Loxahatchee National Wildlife Refuge, was also present.

Next year's conference will focus on the Centennial Celebration which will be observed on March 14, 2003. All of the delegates went home eager to make a very big celebration for this Centennial - the 100th anniversary of the establishment of the first NWR at Pelican Island, Florida. We hope to maximize our cumulative voice by hosting national and regional Friends conferences and workshops. Coincidentally, there is a regional workshop this week, April 12 -14, at the Chassahowitzka National Wildlife Refuge in Homosassa. I will be attending as a representative of LNHA. Mark Musaus will be there representing our refuge in his official capacity as Refuge Manager.

By joining LNHA, you can strengthen our Friends Group so that we can play a role in advocacy. The Refuge System faces a \$2 billion operations and maintenance funding backlog. We need to make Congress aware that a \$100 million increase in the Refuge System budget is desperately needed. Together we can do much to change this. Join LNHA today!

To Join:

Please fill out the following and mail to:

LNHA Friends of the Refuge

P.O. Box 2737

Delray Beach, FL 33447-2737

Name: _____

Address: _____

City: _____

State and Zip: _____

Phone: _____

E-Mail: _____

Individual \$8: _____ Sustaining \$25: _____

Student \$5: _____ Supporting \$50: _____

Family \$12: _____ Organization \$50: _____

Contribution: _____

What Are Those Fruits That Look Like Apples ... They Are Pond Apples

Berni Reeves

The Pond Apple (*Annona glabra*), also known as the Alligator Pear, is a member of the Custard Apple family. It grows in Africa and throughout the American tropics, occurring in Southern and Central America, the West Indies and the Bahamas, and reaching the northern-most limit of its range in South Florida. It grows best in wet soils, such as cypress swamps or pond margins. Along the southern edge of Lake Okeechobee, there was once an almost continuous Pond Apple forest, but all of this has been destroyed by drainage.

The Tree

The Pond Apple is a small, round topped tree, reaching a height of 30 - 35 feet. The trunk is short, between 1 and 2 feet in diameter, and often has a swollen, or buttressed, base. The branches are irregularly shaped and twisted, but form a dense crown, where small air plants may occur. The bark of the tree is thin, reddish-brown in color, with a rough, scaly texture.

The Flower

The flowers, which develop in the spring, are solitary, with single flowers developing from short, drooping stalks, located at the internodes between leaves. They are approximately 1 inch long, pale yellow to creamy white in color, and consist of 6 petals. The outer 3 petals fully enclose the smaller inner petals and are marked with a red spot at their base.

The Fruit

The Pond Apple is so called because its distinctive fruit looks very much like an apple. The fruits are roughly heart-shaped, approximately 3 inches wide, and are originally green in color, becoming yellow blotched with brown as they mature. They develop from the fertilized flowers in late spring and summer and may persist on the tree for long periods, sometimes even until the following spring. Despite the similar appearance to an apple, the fruit of the Pond Apple has little taste and a cottony texture, so, although edible, it is not pleasant to eat. However, it is an important

food source for many animals, such as bears and raccoons, which live in the swamp.



The Leaf

The Pond Apple is semi-deciduous, with most of the leaves being shed during late fall, and new ones developing the following spring. The leaves are elliptical in shape, with lengths of 3 - 7 inches and



Pond Apple flower

widths of 1.5 - 2 inches, the edges, or margins, are smooth and the apex is pointed.

The leathery leaves are bright green above, paler below, and have a thick midrib.

Calling all Volunteers !!

The Biology Department has specific projects regarding the impoundments at the refuge that can be accomplished by volunteers. These projects include: a) transplanting recently laid apple snail eggs from Impoundments C3 and C4 to C8 (volunteer Don Filipiak coordinates), b) transplanting specific submersed vegetation from refuge canals into impoundment C8, c) removing rampant vine growth from trees and shrubs growing along C6, B3 levees along Lee road, d) assisting with fish and invertebrate sampling in C6, C7, C9 and other imoundments as needed, e) assisting with various bird surveys or counts, f) assisting with the annual butterfly survey and other projects as they come up.

If you are interested in helping out on any of these projects, contact **Lois Chapman** at **(561) 734-8303** or send an email to **lois_chapman@fws.gov**.

What's Happening in the Impoundments?

How is the water controlled in the impoundments that are managed for wildlife?

There are ten impoundments in Compartment C (see map on page 12), managed for wildlife and wildlife viewing, that are each surrounded by a levee system. Each impoundment has a water control structure that allows water into or out of the impoundment depending on water levels on each side of the structure. If water needs to be moved and water levels are not at the right height to be moved by gravity, a portable pump (if available) is brought in to move the water from one area to the next.

Levees and water control structures leak, however, and seepage can undermine the efforts of refuge staff to maintain desired water levels. Other problems have been the loss of permanent pumps that could move large quantities of water and the loss of a critical water control structure. This structure is likely to be replaced with special funding in 2002.

Sometimes the water is high. Why?

In an effort to use less herbicides on undesirable plants (cattails, torpedo grass, etc.), refuge biologists and area partners have manipulated the plants by discing, or cutting, then raising water levels. This is done in different impoundments at various times of the year to flood and retard their growth. Also, high water gives aquatic invertebrates and fish a chance to increase their populations relatively free from predation. This is a labor intensive approach and takes a longer time for results, but is healthier for our wildlife and habitats.

What are those dirt mounds doing on top of the levees and when are you going to get rid of them?

Over the years, the canals next to the levees have slowly filled in with silt, making the movement of water in impoundments more difficult. In order to manage water levels in the impoundments more effectively, machinery was brought in to remove soil and to restore the canals next to the levees. The dirt mounds were left for a while to permit them to dry out to enable easier hauling. They remained longer than we had intended due to the temporary loss of one of our maintenance workers and other priorities. Work is currently underway to remove the mounds and give visitors easy access to the rest of the impoundments.

Why are there no birds on the Marsh Trail?

Before 1998, refuge biologists conducted several water drawdowns that had spectacular results in drawing in birds. Since that time, we have attempted the same techniques with less than satisfactory results, partially due to greatly reduced invertebrate, fish, and periphyton (algae and other small critters) populations (periphyton serves as the base for the food web). The same technique used repeatedly also caused the most dominant plants to thrive, creating a monoculture. Biologists are working on restoring plants, such as smartweed, and animals, such as aquatic invertebrates and small fish, that will once again attract the birds to the area. An aquatic vegetation cutting machine (also known as the "cookie cutter") has been used, rather than chemicals, to cut undesirable vegetation. Flooding techniques have also been used in conjunction with the cookie cutter to discourage these plants. Eventually, (with help from volunteers) the seeds from desirable plants, such as smartweed, will be collected and sown into muck to help replace the dense stands of pickerel weed. None of this will happen over night, but the end result should be more natural and less of a shock to the ecosystem.

Why is there too much vegetation in some of the impoundments?

After a decade of passive management, many of the impoundments have become clogged with unwanted vegetation. Historically, the water used in the impoundments has been extremely high in nutrients, *i.e.* phosphorus. This phosphorus laden water has fertilized the vegetation and allowed it to grow unhindered, and the phosphorus has been absorbed by the soil (muck) in the impoundments. With this combination, plants grow quickly and very densely. In addition, Florida has a 365-day growing season with no frost or natural "downtime" for the vegetation to be retarded. We are attempting to control vegetation growth through natural and mechanical means. This has included the use of an aquatic vegetation cutting machine, prescribed fire, and high water to stop or retard vegetation growth.

When are we going to see more birds?

We already are. C6 (see map on page 12) has been attracting birds throughout winter 2001 and spring 2002. Achieving a certain habitat condition for wildlife doesn't just happen. Funding permitting, the staff plans to manage four impoundments for birds in 2002. Much work is needed to rehabilitate water control

Impoundments (cont..)

structures and impoundment levees and canals, as well as replace aging equipment.

Management Plan for Fiscal Year 2002

Impoundments C6 and C7 (see map on page 12), the Marsh Trail, will be managed for visitor viewing of wildlife. Water levels should be lowered opposite of each other so that there is always some wildlife activity going on. These two compartments should both be in prime condition during late November and into December and January and again for spring migration.

C8 (see map on page 12) will be managed for Apple Snail population health in order to benefit the endangered snail kite, a raptor. Management will be though a combination of herbicide, spot spraying, Rx burning, water level adjustments and cypress planting.

C 9 (see map on page 12) will be managed for secretive resident and migratory marsh birds. Selected areas will be herbicided and then Rx burned. A cutter will be used to create a mosaic for secretive marsh birds.

Later in 2002 or possibly early 2003, Impoundment C1 will undergo some changes to make it more of a wildlife viewing area. In cooperation with South Florida Water Management District, a long-term research project construction (more about the research in the next newsletter) will begin with an additional levee. After the levee is completed, working over the rampant cattail will be a priority. There are a few options on how to control it. The refuge staff will have the area aerially herbicided. After a top-kill has been achieved, it will be burned while protecting the cypress at the east end. The area will then be flooded for at least two months, re-assessing vegetation continually and cutting sprouting shoots as necessary. This compartment may take a few years to get cattail under control.

Compartments C5, C10, C2E, and C2W (see map on page 12) will be worked on a very small scale as time allows. Generally, these will be managed for secretive marshbirds, round-tailed muskrats, and cover-loving amphibians.

Total cost for the fiscal year 2002 for management of Compartment C is \$39,095, including the general cost of maintenance employee time and 90 pumping days with gas costs. In addition, replacement of the

water control structure between C6 and B3 (under Lee road) and the structure in Compartment A (cost estimates of \$20,000 each) will be needed. These figures do not include the cost of hours for Bio Employees (956 hours), employees who participate in the burning (120 hours), or employees who replace Water Control Structures (160 hours).

**Long-Range Plans**

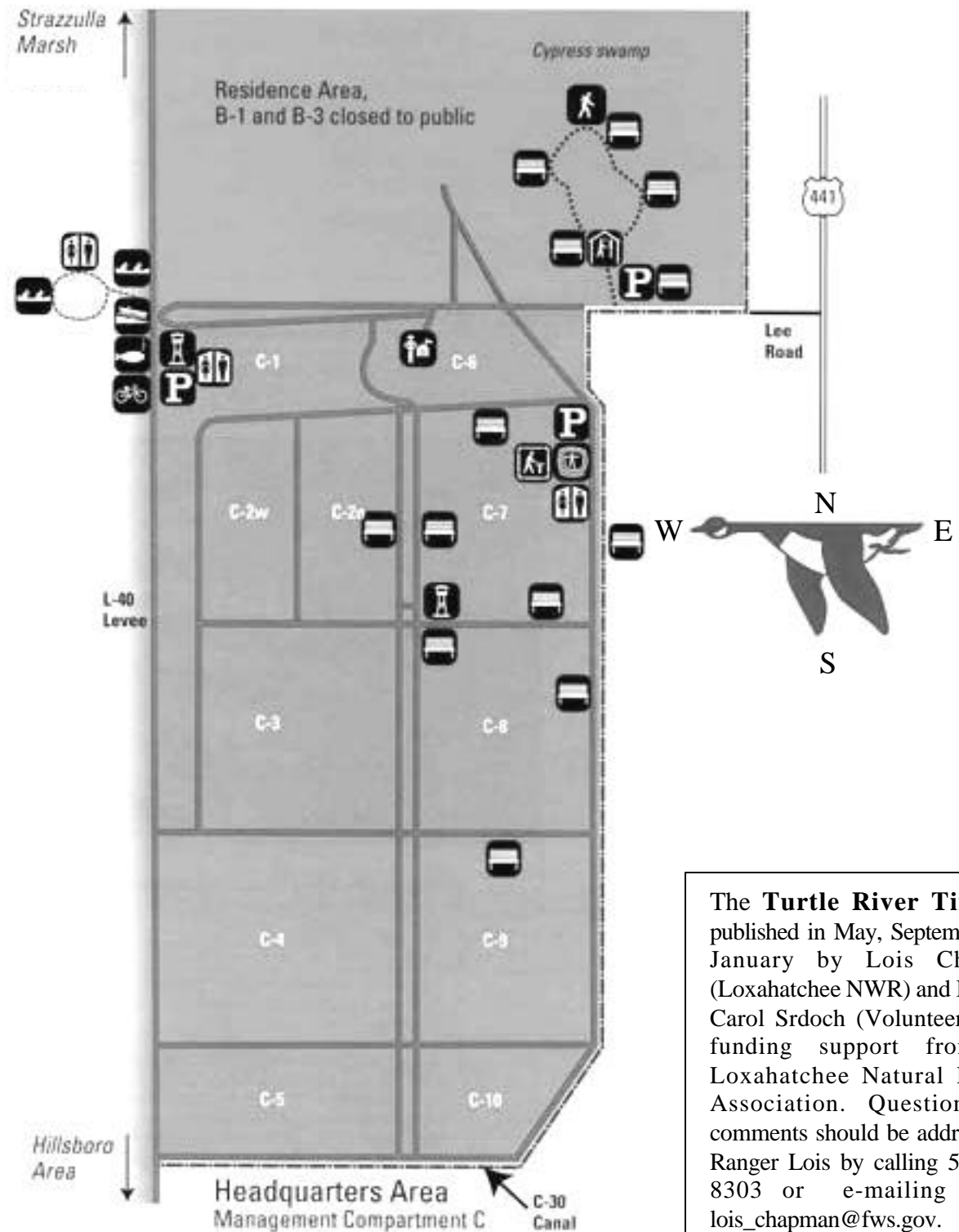
The current water flow design is not adequate. Early in the history of the refuge, a "raceway" was planned but not built. The originally planned raceway canal was to provide a method to move water from the P-1 pump in Upper A, along the eastern foot of the L-40 levee, through Compartments A and B, and running through WCS's (Water Control Structures) S-8 A, B, C, and D under the boat parking lot, into C1 and along the western sides of C2 and C3 (see map on page 12). As other research is planned, the raceway need will increase dramatically.

If this raceway were to be built, water control and availability for all three Compartments (A, B, and C) would become independent and more efficient, allowing individual impoundments to be managed for differing objectives and alleviating unwanted flooding. In addition, the problem of gauging how much water should be pumped, moved and controlled in its southward flow would become more manageable.

When the WCS's on the raceway are installed, additional WCS's should be placed between the eastern edge of Compartment A and the Cypress Swamp. This will give greater ability to manage water in the compartments as well as greater hydrological control for the Cypress Swamp. The approximate cost of this raceway is 1 million dollars. The refuge does not anticipate getting funding for this project anytime soon, but staff continue to keep the dream alive.

Cookie Cutter in action in C-7

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